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General Articles

SOME ASPECTS OF GENERAL ANÆSTHESIA IN ANIMALS

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The Dog

(A) INTRAVENOUS NEMBUTAL ANÆSTHESIA

We have, on a previous occasion, recorded the use of nembutal, by intravenous injection, as a surgical anæsthetic in the dog, in 130 cases (*Veterinary Record*, 14, 49, December 8th, 1934). In some of the early ones, consequent upon inexperience, results were not entirely satisfactory. In this second series of 260 cases they have been much more uniform. Confidence in the use of the drug has encouraged us to continue injection until the requisite degree of anæsthesia has been obtained, whilst further experience in assessing the degree of anæsthesia present has resulted in greater uniformity.

The Injection.—Too much stress cannot be placed on the rate at which the injection is made. It should occupy two minutes at least, and during the latter part frequent stoppages should be made while the drug is being taken up by the cells of the central nervous system. There is a tendency, if it is made too quickly—and by this is meant a full dose in ten to thirty seconds—for a stage of excitement, which may be violent, to precede the onset of anæsthesia, which in turn may become alarmingly deep. In this connection the greyhound is the breed which has been found to be most liable to excitement during the induction of anæsthesia. Experience makes one almost 100 per cent. successful in the technique of intravenous injection, although difficulty is still encountered in some of the short-legged breeds, particularly the Dachshund and the small Pekingese.

Assessment of Anæsthesia.—The first indication of the onset of narcosis is that the animal sighs. This occurs when about two-thirds of the anæsthetic dose has been injected. The injection should be slowly continued. The next indication to be observed is that the head, if released, will be voluntarily raised and then allowed to fall gently on to the table. At this point injection should be stopped for 20 to 30 seconds. Interference with the lower jaw will now provoke a yawn. Continue slowly. The next phase to be observed is that the head, if lifted by the assessor, immediately falls to the table. The lower jaw has become completely relaxed, and the tongue when pulled out is not drawn back into the mouth. At this stage the pedal reflex is still very active. Pinching of the web of the upper fore digit between the finger nails will cause the limb to be drawn away vigorously. This is the point at which injection should be stopped when it is intended to operate about the mouth—the extraction of teeth, exploration of the fauces, pharynx and œsophagus, etc. Anæsthesia will deepen a little up to the fourth minute, but the swallow reflex will remain.

For abdominal interferences a little more of the drug must be given, and after each additional injection a stop of ten seconds or so adopted. From this point on the activity of the pedal reflex is the most reliable guide. The injection is stopped whilst the pedal reflex is still present, but only comprises a slight contraction of the muscles without appreciably moving the limb.

This degree of anæsthesia is a safe one; there is complete analgesia, and it will be maintained for 30 to 45 minutes. As has already been pointed out, if traction on peritoneum provokes some slight reflex movement it is a simple matter to deepen by the use of a little ether by inhalation.

If minimum anæsthetic doses are used in this manner it will be found that recovery from the anæsthetic is comparatively rapid. At the end of three hours, although the animal is still narcotised, peripheral stimulation will provoke considerable voluntary response.

Additional Details regarding Technique.—Boiling as a method of sterilising syringes has been discontinued, due to breakages. Syringes and needles are now kept immersed in methylated spirit, and rinsed in sterile water before use.

It cannot be too strongly emphasised that for this method a dose is not computed, but the injection is slowly continued until the required degree of anæsthesia is attained. For reasons of economy an estimation of what will be a little more than the requisite dose is made, but if one relies upon a dose computed according to body-weight and injects it without paying attention to the degree of anæsthesia present, very irregular results will be obtained. Doses were discussed in our previous communication.

In addition to its use as a surgical anæsthetic, the agent has been used, in a similar manner, in the treatment of eclampsia in the bitch, and in strychnine poisoning, with excellent results.

Contra-indications.—Case No. 232 illustrates a contra-indication of nembutal—Cæsarian section in which the fœtuses are living.

No. 232. An 8 years terrier, female, primigravida. The animal was grossly fat, pregnant with multiple fœtuses, and parturition was 48 hours overdue. Primary uterine inertia was suspected and it was decided to perform Cæsarian section. Having in mind a possible narcotic action on the fœtuses, deep narcosis only was induced with nembutal, and anæsthesia completed by oxygen-ether. Six puppies were removed from the uterus. Three commenced to breathe immediately on removal, but it was 30 minutes later before resuscitation could be relaxed with the remaining three. The six puppies appeared to be in a condition of general anæsthesia for five hours, after which they quickly commenced to suckle. The mother had completely recovered consciousness in three hours.

In view of this result it is suggested that for Cæsarian section operations when the fœtuses are living, morphine-ether, or morphine-chloroform anæsthesia be adopted, according to the size of the bitch. The dose of morphine should be small—gr. 1/40th per lb. is suggested. Cases of Cæsarian section have been met, in which morphine-ether anæsthesia was used; the dose of morphine being gr. 1/20th per lb., and in which narcosis of the puppies persisted for as long as seven hours after operation.

Toxicity.—We have asserted that, in addition to the advantages of the method associated with the ease and rapidity of induction of anæsthesia, it is considerably less toxic than the accepted methods of inhalation anæsthesia in the dog. We have deplored the absence of reliable data regarding deaths during or subsequent to chloroformisation, and it is for this reason that we append notes of our fatal cases.

The 260 routine surgical cases under review may be summarised as follows:—

A.—*Operations upon healthy animals.* (By healthy is inferred that it was reasonable to assume that the detoxicating powers of the liver, and the excretory functions of the kidneys, were normal at the time of operation.)

102—comprising:—
Fractures—16. Luxations—10. Repair of gastrocnemius tendon—1. Exploration of the pharynx, œsophagus, rectum, abdomen—8. Amputations—5. Operations on the eyeball and its appendages—9. Operations on the external ear—12. Extirpation anal glands—2. Castration—2. Operations for hernia—17. Operations for cysts—6. Benign neoplasms—2. Sinuses—4. Extraction of teeth—2. Oöphorohysterectomy—5. Cæsarian section—1.

B.—*Operations upon diseased animals.* (By diseased is inferred that it was reasonable to assume that toxic or degenerative changes were present in the liver and/or kidneys; or that severe hæmorrhage had occurred, rendering the animals especially susceptible to anæsthetic intoxication). Many of the subjects in this table were acutely ill at the time of operation.

158—comprising:—

Enterotomy for obstruction by foreign body	6
Gastrotomy	9
Metrectomy for pyometra ...	22
Cæsarian hysterectomy ...	4
Urethrotomy for obstruction by calculi	11
Cystotomy for calculi	9
Œsophagotomy for obstruction by foreign body	3
Operations for sepsis	19
Operations for malignant neoplasms	22
Operations for gross dental sepsis	24
Enucleation of the eyeball—sepsis	6
Operation for intussusception	1
Various	19

Of these cases 24 of the animals are dead, having died during or subsequent to anæsthesia, or having been destroyed as hopeless, at the time. These deaths may be summarised as follows:—

TABLE I

Positively due to the toxic action of the anæsthetic:—

Three cases.

(*a*) No. 180. 1½ years terrier, female, Healthy. Resection of the external ear for chronic otitis. The animal weighed 20½ lb. and was given 5 grains. Deep anæsthesia was induced and death occurred from respiratory failure six hours later.

(*b*) No. 331. 8 years terrier, female. Condition fair. Operation for mammary neoplasm. The animal weighed 22½ lb. and combined morphine-nembutal was anæsthesia adopted, 1 grain of the former and 3·8 grains of the latter being used. Death occurred seven hours later from respiratory failure.

Post-mortem examination revealed no abnormalities other than a little thickening of the mitral valve in the 8-year-old bitch.

(*c*) No. 338. 5 years Pomeranian, female. Condition fair. Cystotomy for multiple calculi. Weight 9 lb. Dose given 1·8 grains. At five minutes respirations became very shallow. CO_2 by inhalation provoked some stimulation of respiratory centre. At 15 m. respirations ceased. Intracardiac adrenaline provoked no response. *Post-mortem* examination revealed some fatty degeneration of the liver.

TABLE II

Cases in which there was extensive disease present, and in which it is considered that toxæmia played the primary part, but the anæsthetic was a contributory factor:—

Nine cases.

A.—In which death occurred during anæsthesia—2:—

(*a*) No. 140. 8½ years Pomeranian, female. Metrectomy for pyometra. Cervix closed and animal very toxic. Weight 11¾ lb.—dose 3·2 grains. Respiratory failure occurred ten minutes later. Intra-myocardiac injection of adrenaline provoked no response.

(*b*) No. 159. 10 years terrier, female. Cæsarian hysterectomy—dystokia of three days' duration. Uterine contents putrid. Weight 17½ lb.—dose 2·75 grains. Anæsthesia definitely lightened before death which occurred at seven hours.

B.—Death subsequent to recovery from anæsthesia—7:—

(*c*) No. 149. 9 years Pug, female. Metrectomy for pyometra, cervix sealed. Very toxic. Weight 15½ lb., dose 1·5 grains (the normal dose for a 15 lb. dog is 3·5 grains, this gives an indication of the degree of toxæmia present). Deep anæsthesia lasted for 1½ hours, followed by ten hours' narcosis. Consciousness was fully regained, but the animal died 48 hours after operation.

(*d*) No. 200. 8½ years Spaniel, female. Four years previously this animal had had cystotomy performed for a single "mulberry" calculus. It had been in normal health until three weeks prior to the second operation, when it was suffering from a purulent cystitis with a rapidly forming "soft" calculus. There was marked toxæmia.

Weight 28 lb.—dose 6·5 grains. Anæsthesia was supplemented by oxygen-ether. The dog only partially recovered from the anæsthetic and died 30 hours after operation. *Post-mortem* examination revealed a bilateral purulent pyelo-nephritis with renal calculi.

(*e*) No. 201. 13 years Pomeranian, female. Metrectomy for pyometra. Weight 28½ lb.—dose 4·2 grains (normal dose for this weight —6 grains). Recovered from anæsthetic after seven hours. Died 30 hours later. *Post-mortem* examination revealed extensive fatty degeneration of the liver, there was also some hæmorrhage from the ovarian stump.

(*f*) No. 202. 9 years terrier, female. Very thin—albuminuria. Operation for chronic suppurative mastitis. Weight 28½ lb.—dose 6 grains. Recovered from anæsthetic in six hours. Appetite returned. Died unexpectedly five days later. *Post-mortem* examination revealed extensive fatty degeneration of the liver and kidneys.

(*g*) No. 222. 11 years terrier, female. Very fat. Operation for chronic mastitis. Weight 35 lb.—dose 5·5 grains. Narcosis persisted for 18 hours. Death occurred suddenly seven days later. *Post-mortem* examination—fatty degeneration of liver and kidneys.

(*h*) No. 277. 12 years Labrador, female. Condition fair. Suppurating mammary neoplasm. Weight 67½ lb.—dose 12 grains. This animal appeared to make a normal recovery. Ten days later it went off its food, became thirsty and rapidly lost flesh. It was destroyed three weeks after operation, but no autopsy was made.

(*i*) No. 334. Ten years Yorkshire terrier, female. Toxic. Metrectomy for pyometra. Weight 8 lb.—dose 1·75 grains. Animal made a good recovery from the anæsthetic and appeared to be doing well, when it suddenly died three days after operation. No autopsy made.

It will be observed that in four of these cases in which there was chronic mammary suppuration subsequent *post-mortem* examination revealed fatty degeneration of the liver. We have on many occasions observed necrosis of the liver associated with chronic suppuration in the mammæ.

TABLE III

Cases in which death was due to the disease present, and in which it was thought that the anæsthetic could not be incriminated:—

Three cases.

(*a*) No. 139. 3 years Cairn, male. Intrathoracic œsophageal obstruction 14 days' duration. Condition very poor. Weight 11½ lb., dose 1·75 grains. Light anæsthesia only, augmented by local infiltration. Animal completely recovered from narcosis but died seven days later from toxæmia and dehydration.

(*b*) No. 188. 9 years Dandie Dinmont female. Toxic. Metrectomy for pyometra. Weight 23lb. — dose 3·25 grains (normal dose for a 23 lb. dog—5 grains). Completely recovered from narcosis, but died four days later—peritonitis.

(*c*) No. 360. 3 years Dalmatian, male. Acutely ill. Intestinal obstruction of five days' duration. Weight 60 lb.—dose 4·5 grains (normal dose—10 grains). Recovered consciousness in five hours, died at 12 hours from acute toxæmia.

TABLE IV

Cases destroyed as hopeless after anæsthetisation:—

Nine cases.

(*a*) No. 174. 5 years terrier female. Condition poor. Weight 20 lb.—dose 4·5 grains. Examination of mouth revealed gross infection of the tongue.

(*b*) No. 226. 10 years Airedale, male. Condition very poor. Weight 36 lb.—dose 6·8 grains. Exploratory laparotomy for persistent vomiting. Animal destroyed four days later. Chronic cardiac debility causing chronic venous congestion of the liver.

(*c*) No. 234. 8 years mongrel female. Condition poor. Weight 41 lb.—dose 7·75 grains. Exploratory laparotomy for persistent vomiting. Destroyed seven days later. *Post-mortem* examination revealed an abscess in the posterior mediastinum.

(*d*) No. 244. 11 years Elkhound, male. Toxic—chronic retention of urine. Weight 49 lb.—dose 8·75 grains. Examination of the uro-genital system. Destroyed four days later. Suppurative prostatitis.

(*e*) No. 284. 2 years Cairn, female. Condition very poor. Weight 9½ lb.—dose 1·1 grains. Examination of the abdomen and uro-genital system to account for acute vomiting. Destroyed three days later. The case was one of sub-acute nephritis.

(*f*) No. 286. 11 years mongrel, female. Condition very poor. Weight 23½ lb.—

dose 2·75 grains. Exploratory laparotomy revealed extensive invasion of liver by new growth. Destroyed whilst anæsthetised.

(*g*) No. 287. 6 months terrier, female. Condition fair. Weight 10 lb.—dose 3 grains. Exploratory laparotomy. Infiltrating sarcoma involving the bladder wall and the uterine body. Destroyed whilst anæsthetised.

(*h*) Young mongrel, female. Recent street accident case. Animal in a state of collapse. Weight 16 lb.—dose 2·5 grains. Exploratory laparotomy revealed intra-abdominal hæmorrhage and rupture of both ureters at their junction with the bladder. Destroyed whilst anæsthetised.

It is considered that in any record of deaths from anæsthesia only four of this series would be included. These are Cases (*a*), (*b*) and (*c*) of Table I, and Case (*a*) of Table II—A. That is four deaths in 240 cases.

The question to be answered is: Could these have been prevented? It is our view that they could have been. Let us review them. In Case No. 180, the dose was a little on the large side and profound anæsthesia was induced. Five hours later the animal, whilst still anæsthetised, was breathing regularly and well, and no alarm was felt. At six hours it was found to be dead. It is possible that some mechanical impediment to respirations, such as the animal's tongue or its blanket was the cause. Had respiratory failure been observed and vigorous treatment adopted, it is thought that this animal could have been saved. In Case No. 331, combined morphine-nembutal anæsthesia was employed (this will be discussed in detail later), and it is thought that the depressant action of morphine on the respiratory centre was the greater factor in causing death. In Cases Nos. 338 and 140, both very small animals, in which death occurred within 15 minutes of induction, it is thought that overdosage was the cause. It is very easy when using small doses to make the injection too quickly, and this is what occurred.

Our reason for writing at such length on the subject of intravenous nembutal anæsthesia in the dog is that we believe it to be infinitely superior to the accepted methods of inhalation anæsthesia; in fact, by its introduction canine surgery becomes revolutionised. These details are an attempt to justify this belief.

(B) Morphine-Nembutal Anæsthesia

In 21 cases previous morphinisation (half to one hour) has been adopted as an adjunct to intravenous nembutal anæsthesia. Results have varied. In 95 per cent. of cases there has been a definite reduction in the amount of nembutal required, and many results suggest that there is a synergistic action between the two drugs. The optimum dose of morphine sulphate has not yet been established, but in dogs up to 70 lb. weight it would appear to be between 1/30th and 1/40th of a grain per lb. Using this dose of morphine sulphate there has been a reduction in the quantity of nembutal required of from one-third to two-thirds of the total estimated dose. Increasing the dose of morphine above does not appear to bring about a proportionate reduction in the quantity of nembutal required; in fact, it is thought that it may increase the risk of respiratory failure occurring.

When dealing with very heavy dogs (over 70 lbs.) it would appear that the dose of morphine may be reduced to 1/50th and even 1/70th of a grain per lb., and still effect a similar reduction in nembutal.

The use of morphine facilitates handling of a vicious dog; at the same time, the dose of nembutal being reduced the cost (a by no means inconsiderable feature) is lessened. We are inclined to favour the method in large dogs (say, over 50 lb. weight), but do not think it has any advantages over nembutal alone in small ones.

TABLE V

Morphine—Nembutal

No.	Weight. lbs.	Age and Breed.	Condition.	Doses. A.—grains per lb. B.—actual dose in grains.		Estimated reduction in Nembutal required. Grains.
				Morphine.	*Nembutal.*	
313	13½	3 months Alsatian M.	Healthy Umbilical hernia	A. 1/30 B. ½	1/6 2¼	1¼
333	15	Aged Pom. M.	Poor Dental disease	A. 1/45 B. ⅓	1/10 1½	1¼
314	15	7 years Pom. M.	Poor Dental disease	A. 1/100 B. ⅛	1/7 2	1
315	15	5 months Terrier M.	Healthy Fracture	A. 1/30 B. ½	1/10 1½	2
316	16	10 months Aberdeen F.	Healthy Acute eczema	A. 1/16 B. 1	1/8 2	2
317	17	5 months Aberdeen F.	Fair Gastrotomy	A. 1/68 B. ¼	1/7 2¾	1¼
*331	22½	8 years Terrier F.	Fair Mammary neoplasm	A. 1/20 B. 1	1/6 3⅘	½
318	36	8 years Mongrel F.	Toxic Pyometra	A. 1/50 B. ¾	1/8 4½	1½
319	30	2½ years Terrier M.	Healthy Hæmatoma	A. 1/30 B. 1	1/15 2	4
320	38	10 years Chow M.	Fair Dental disease	A 1/20 B. 2	1/7 5½	2
321	44	8 years Mongrel M.	Healthy Submaxillary cyst	A. 1/60 B. ¾	1/5 8	None

*Case No. 331, which died, has already been reviewed in Table I.

No.	Weight lbs.	Age and Breed.	Condition.	Doses. A.—grains per lb. B.—actual dose in grains.		Estimated reduction in Nembutal required. Grains.
				Morphine.	*Nembutal.*	
322	58	9 years Airedale F.	Good Anal glands	A. 1/40 B. 1½	1/7 8¼	3
323	49	11 years Airedale F.	Fair Mammary neoplasm	A. 1/32 B. 1½	1/10 5	4
324	60	2 years Alsatian M.	Good Dental disease	A. 1/30 B. 2	1/8 7	5
325	65	9 years Alsatian M.	Fair Dental disease	A. 1/32 B. 2	1/8 8	5
326	65	1½ years Airedale M.	Fair Sinus	A. 1/42 B. 1½	1/11 6	6
327	69	7 years Alsatian F.	Fair Mammary Neoplasm	A. 135 B. 2	1/8 8½	5
328	70	8 years Alsatian F.	Good Extirpation eyeball	A. 1/45 B. 1½	1/8 9	5
329	73	8 years Airedale M.	Good Sepsis	A. 1/50 B. 1½	1/25 5	7
334	83	9 years Airedale M.	Fair Neoplasm	A. 1/55 B. 1½	1/10 8½	5
330	130+	4 years Gt. Dane M.	Poor Amputation tail (Chronic nephritis)	A. 1/70 B. 2	1/12 12	8

In addition, the majority of these animals were given atropine sulphate, in doses varying from 1/500 to 1/50 grain, to control the parasympathetic stimulation of morphine.

The Horse

Chloroform by inhalation is generally accepted as being the most satisfactory method of inducing general anæsthesia in the horse. Whilst most surgeons prefer to cast and secure the animal prior to administration, others apply the mask to the animal's nostrils in the standing position, and when the stage of narcosis with locomotor incoördination is reached, the animal may fall, or it may easily be pulled over. Induction is completed with the animal down. Whichever method is employed, difficulty is experienced in obtaining a concentration of chloroform, in inspired air, sufficient to induce anæsthesia in a reasonable time, without greatly reducing the supply of air. In both methods there is undoubtedly some degree of asphyxiation. For rapidly-performed operations such as castration, this method appears to give quite satisfactory results. When, however, it is necessary to keep an animal evenly and continuously anæsthetised for a half to one hour, the method is considered to be unsatisfactory.

The previous narcotisation of the animal by the administration of chloral hydrate by the mouth, or stomach tube, greatly facilitates casting, reduces the amount of chloroform necessary, and generally makes induction and continuation of inhalation anæsthesia more satisfactory.

We have been impressed by the fact that, in many cases, when comparatively small doses of chloroform are administered in the cast position and air allowed, after an initial and transient phase of struggling consequent upon compulsion to inhale a pungent and irritating vapour, the animal passes into a narcotic state. All struggling ceases—the horse lies perfectly quiet. Corneal and light reflexes are active, although the eyeball is often moved from side to side. The tail is relaxed, but interference with it will provoke a strong response. This phase will often persist for ten to 15 minutes after the mask has been removed. It is often mistaken for anæsthesia. This it certainly is not, as cutting of the skin will immediately prove. We take advantage of this state, which might be termed "chloroform narcosis" for the performance of minor operations under local anæsthesia.

Intravenous chloral hydrate narcosis has not attained popularity in this country. The authors have explored the method and have formed the opinion that whilst it has some advantages over the stomach-tube route, these are outweighed by the disadvantages. Sight cannot be lost of the fact that concentrated solutions of chloral hydrate are intensely irritant, and that if the solution becomes accidentally introduced into the perivascular tissue serious results may ensue. A not inconsiderable experience of intravenous injections convinces us that this accident is unavoidable in some cases. Again, it is thought that chloral hydrate is a drug of high toxicity when used in full anæsthetic doses.

We favour the stomach-tube route, and employ a dose of 75 grains per 100 lb. body-weight, given in one to one-and-a-half gallons of warm water. It is essential that food shall be withheld on the day of operation, preferably for 24 hours. Our aim is to induce a degree of narcosis whereby the animal is just able to maintain the standing posture without falling. The hobbles may then be applied and the animal cast with little or even no struggling.

In our view, the ideal anæsthetic for the horse must conform with the following:—

(1) Administration must be effected in the standing position. With our present knowledge this will entail intravenous injection, and so the agent must be entirely non-irritating to avoid risk of injury through errors in technique.

(2) The onset of anæsthesia must be rapid and shall not be associated with a phase of narcotic excitement. That is, the animal shall just fall to the ground.

(3) The duration of anæsthesia shall be from 20 to 30 minutes, after which recovery shall be

rapid so that the animal is able to rise and walk within an hour. If it is necessary to prolong anæsthesia beyond this time, chloroform should be administered when evidence of lightening occurs.

(4) The period of recovery shall not be associated with a stage of narcotic excitement.

(5) There shall be no deleterious after-effects such as toxic degeneration of the liver and/or kidneys.

Intravenous Nembutal.—The agent has been used in the horse in America, but no detailed conclusions are to hand. We have employed it in four surgical cases.

Administration.—Two methods have been employed:—

(*a*) In the standing position. Injection into the jugular vein by pumping.

(*b*) In the cast position. By slow injection into the jugular vein by gravitation, the degree of narcosis being assessed as injection proceeds.

Using the first method, it was necessary to compute the dose which would give the desired degree of narcosis when completely absorbed, and inject it quickly. It was our previous experience with intravenous chloral hydrate that if some slow method of injection, such as gravitation, was adopted, the animal floundered and went down before the required dose had been introduced. The apparatus used was a modification of that introduced by the late Sir Stewart Stockman for the injection of bovine abortion vaccine.

No. 1.—Aged brown mare. Condition good. Weight 1,180 lb. Large hæmatoma left buttock. Computed light anæsthetic dose—$\frac{1}{8}$ grain per lb. body-weight. Total dose, 150 grains, dissolved in 200 c.cs. of water, was injected *via* the jugular in 25 seconds. At 35 seconds the animal fell backwards on to its haunches and then to its right side. Some slight paddling movement of the limbs occurred to the fourth minute, when it became completely relaxed. Pulse 90, respirations slow and deep. Anæsthesia was not quite complete. Incision provoked some quivering of the limb and so it was augmented by local infiltration. At 65 minutes it attempted to rise but was unable to do so. Hobbles were applied. At 90 minutes the hobbles were removed, and an attempt made to get the animal up—failed. At 2 hours 10 minutes the animal rose without assistance, and was walked around. At three hours it was feeding.

No. 2.—7-year-old Roan pony mare. Condition good. Weight 450 lb. Sinus due to localised necrosis of the mandible. Computed dose 60 grains (between 1/7th and 1/8th grain per lb.). Dose dissolved in 100 c.cs. of water and injected by the jugular. At 40 seconds after 70 c.cs. had been injected the animal fell to the ground, there was no struggling. Deep narcosis only was present, and the remaining 30 c.cs. was given. Although the animal was completely relaxed, there was not complete analgesia, and it was augmented by local infiltration. The animal was able to rise one hour later. There were no after effects.

No. 3.—6-year-old Brown pony stallion. Condition excellent. Weight 540 lb. Vicious. For castration. Computed dose—1/7th grains per lb.—75 grains, dissolved in 100 c.cs. Injection made *via* the jugular in 30 seconds. The animal did not go down. At four minutes it was very drowsy and staggered when moved. It offered no resistance when the scrotum was being palpated or when the hobbles were applied. There was no struggling when cast. Full anæsthesia was induced by the administration of $\frac{1}{2}$ oz. of chloroform using a Cox inhaler allowing plenty of air. The animal rose 10 minutes after operation was completed.

No. 4.—Aged roan cob gelding, 800 lb. Condition good. Plantar neurectomy. Animal not prepared. The animal was first cast and hobbled and the solution of nembutal (1 grain in 1·5 c.cs.) injected by gravity into the jugular vein. At two minutes, when 120 grains had been given, the injection was stopped and the degree of anæsthesia present assessed. The tail was relaxed, corneal reflex active; vigorous response to pin-prick. At three minutes the injection was recommenced and continued until 140 grains had been given. Again a pin-prick provoked a slight response. At six minutes injection continued until 160 grains had been injected. Full anæsthesia was now present. There was complete muscular relaxation. Corneal reflex was present but sluggish. Pulse 80, respirations slow but deep. Section of the plantar nerves provoked no response. At 45 minutes there was evidence of anæsthesia lightening—the animal moved its legs. Hobbles were removed. At 1$\frac{1}{2}$ hours there were vigorous galloping movements, and it was necessary to hobble the animal. At two hours attempts were made to get the animal up, but these resulted in narcotic struggling which was difficult to control. The animal was again hobbled and kept down for a further two hours, when it was able to rise and walk. It immediately commenced to feed. There were no undesirable after-effects.

Discussion.—These results indicate that the full anæsthetic dose of nembutal for the horse, by intravenous injection, is similar to that of the dog, *viz.*, approximately one-fifth of a grain per lb. body-weight. The course and duration of anæsthesia is also similar. It is maintained at its original depth for a period of about 45 minutes, after which it progressively lightens, the animal being able to stand again four hours or so later. As is the case with the dog, the period of recovery may be accompanied by some

narcotic struggling. Whilst this is of no great consequence in the small animal, it may be a very serious matter in the horse unless adequate steps are taken to restrain the animal until complete consciousness is restored.

If the drug is administered in the standing position it will be necessary to compute the accurate anæsthetic dose and inject it quickly. Our experience is that the injection should be completed in 40 seconds, otherwise the animal will fall to the ground when deep narcosis only has been obtained.

It has already been pointed out, in our previous communication on intravenous nembutal anæsthesia, that in any method whereby computation of a dose by body-weight is necessary, variations in susceptibility, which are quite impossible to foretell, will cause marked variations in results. It is probable that any stage from light anæsthesia to profound and even fatal anæsthesia will result.

If the horse is first cast, and the injection made slowly by gravity, taking five minutes or so to complete it, the method becomes similar to that adopted in the dog. The degree of anæsthesia present can be assessed as administration proceeds, and the injection stopped when the required depth has been obtained.

It was hoped that nembutal would help to solve some of our anæsthetic problems in the horse. This hope has not been realised. It is considered that the length of time the animal remains down when an anæsthetic dose has been given, and the tendency there may be for it to indulge in narcotic struggling during the period of recovery, makes it inferior to the methods already at our command.

We have considered the use of the "short-acting" barbiturate evipan sodium in the horse. Our experience in the dog, however, has been that this drug is much more liable to provoke struggling during the stage of recovery than is nembutal.

Our conclusions are that for the performance of operations on the horse in the recumbent position, the following are the most satisfactory forms of anæsthesia:—

(1) For quickly performed operations on immature animals, such as castration of the colt—chloroformisation (Hobday's method).

(2) For abdominal interference such as ovariotomy, radical operations for hernia; extensive cutting operations such as fistulous withers, scirrhous cord; or for castration of the adult—chloral hydrate narcosis (stomach tube) augmented by chloroform allowing an adequate supply of air.

(3) For local operations about the skin, limbs, feet and tail—chloral hydrate narcosis augmented by systematic subcutaneous and/or perineural (possibly epidural) infiltration of a 5 per cent. procaine hydrochloride solution with adrenaline.

In animals in which the stomach tube cannot be passed, first cast and then induce "chloroform narcosis." Complete by the use of local anæsthetic.

The Cat

(1) Ether-Oxygen Anæsthesia.—The indications for laparotomy in the cat are less numerous than in the dog. They are confined chiefly to ovaro-hysterectomy, operations for umbilical hernia, and castration of the abdominal cryptorchid; all of which are performed on young and healthy animals. Diseased conditions in the adult calling for abdominal surgery are confined to pyometra, dystokia and an occasional case of ventral hernia.

It is our opinion that the most satisfactory anæsthetic for such operations is ether by inhalation, since induction is easy and rapid, recovery is rapid, and the risk of death occurring during anæsthesia is small.

An apparatus has been designed, using a closed metal mask, whereby the animal is compelled to inhale a mixture of ether vapour, oxygen and carbon-dioxide. As reference has been made to this in this journal on a number of previous occasions (notably *Veterinary Record*, **15**, 34, August 24th, 1935; **13**, 24, June 17th, 1933), it is not proposed to discuss it further now.

As regards toxicity—in a series of 757 speyings performed during the last two years, six deaths during anæsthesia have occurred.

(2) Nembutal Narcosis.—There are many surgical conditions encountered in the cat in which some form of narcosis, similar to, but deeper than, morphinisation of the dog, is required: often as a preliminary to inhalation anæsthesia or as an adjunct to local infiltration. Amongst the conditions referred to are: dental disease, hæmatoma of the external ear, abscesses about the face and head, "cat-bite" sepsis about the limbs, buttocks and tail, fractures, obstruction of the urethra, extensive skin disease. It is in these that we consider nembutal to be of great value.

A striking feature of the action of the barbiturates in the cat is that they induce a progressive narcosis without any tendency to narcotic excitement. This is in marked contrast to the action of morphine in this animal, and also to the action of sub-anæsthetic doses of nembutal in the dog. (It has been stressed that when using nembutal in the dog anæsthesia should always be induced.)

The weight of the average cat being from 7 to 9 lb., the anæsthetic dose of nembutal is a small one, generally from 1½ to 2 grains. When using small doses such as these great care must be taken or fatal overdosage may occur. The tendency to give a cat a 1½-grain capsule irrespective of its size and condition cannot be too strongly deprecated. Many of the cats we are called upon to treat are suffering

from sepsis, a condition which greatly predisposes the animals to the toxic action of anæsthetics.

For these reasons we use nembutal in the cat as a narcotic rather than an anæsthetic, our aim being to induce a degree of narcosis whereby the animal assumes a state similar to deep natural sleep, but from which it can be partially roused if vigorously stimulated. Operation is then performed under local infiltration using a 1 to 2 per cent. procaine hydrochloride solution with adrenaline.

Oral and Intraperitoneal Administration.—The usual method of administration is by the mouth, a dose varying from 1/6th to 1/5th of a grain per lb. being given in capsule. The onset of narcosis is quiet and it has generally attained its maximum depth in 30 minutes. If oral administration cannot be effected, intraperitoneal injection is adopted, using a similar dosage. The onset of narcosis is more rapid, maximum depth being present in from ten to 15 minutes.

Whilst the doses mentioned are safe narcotic doses in healthy animals, toxic subjects will be met in which they will provoke deep and possibly fatal anæsthesia. Thus a careful enquiry into the history of the case must be made—the duration of illness, and particularly the length of time the animal has been without food—and the dose moderated accordingly.

Intravenous Injection.—It being our view that the only rational way to use the non-volatile narcotics is by slow intravenous injection, this method has been adopted in the cat in a series of 33 cases.

Injection is made into the radial vein of the right fore-limb. An assistant holds the animal under his right arm and pressed against the body. With the fingers of his right hand he grips the cat's right fore-limb immediately behind the elbow. This serves to extend the limb and raise the vein. With his left hand he grips the skin at the back of the neck, holding the head up.

The injection is prepared as for the dog, but a greater dilution is made to prevent too rapid administration, *viz.*, 1 grain in 2 c.cs. A 2 or 5 c.c. "Record" syringe is employed, using a fine needle—15 mm. × 0·3 mm. During injection the operator grips the paw with his left hand. The degree of anæsthesia is assessed as in the dog. The first indication of the onset of narcosis is licking of the lips or sneezing. For light anæsthesia injection is continued until the jaw is relaxed but an active pedal reflex persists. The duration of injection is from three to five minutes.

Summary.—Intravenous nembutal narcosis has been adopted in 33 cats. The animals' weights have varied from 5 to 14 lb., and doses from 0·5 to 2·75 grains (1/10th to ¼ grain per lb.). In two cases only was deep anæsthesia induced, whilst in 30 light anæsthesia or deep narcosis was obtained. In one case the agent was fatal:—

No. 25.—1 year, female. Weight 8 lb. Eclampsia. Dose given—2·25 grains. Due to the convulsions, great difficulty was experienced in assessing the degree of anæsthesia present; in addition, injection was made too quickly. Respiratory failure occurred shortly after completion of the injection. Death was due to over-dosage.

The conditions for which intravenous nembutal narcosis was employed were:—

Operations for extensive sepsis	13
Setting of fractures	6
Operations for dental disease	5
Operations on eyes and eyelids	3
Operations on external ear	3
Œsophagotomy	1
Relief of urethral obstruction	1

The work under review has been carried out in the Beaumont Animal Hospital of the Royal Veterinary College.

TUBERCULOSIS BACILLÆMIA

In a recent issue, *The British Medical Journal* stresses the service rendered in phthisisiology and to bacteriology as a whole by the Health Organisation of the League of Nations in issuing a report on "the blood culture of the tubercle bacillus according to Loewenstein." The report shows that whereas Loewenstein still obtained a high percentage of positive reactors in tuberculosis, dementia præcox, and rheumatism (although not so great as previously reported by him), the eminent workers secured to collaborate with him in the preparation of a mutually controlled plan to confirm (or confute) his findings could not in the same blood samples find bacilli in more than 2 per cent. of tuberculous patients (all forms), and none in the other diseases studied.

It would therefore appear that Loewenstein's claims in regard to the isolation of tubercle bacilli in the blood, which have attracted world-wide attention, will be even more vigorously contested in the future than they have been hitherto.

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ZOOLOGICAL GARDENS

At the Conference of Directors of European Zoological Gardens recently held at Basle it was decided to enlarge the scope of the conference by making it international. So far Germany, Austria, Switzerland, Holland, Poland and the Scandinavian countries have been represented. It is hoped now to include directors of zoological gardens from Great Britain, the United States, France, Belgium and other nations. The meeting in 1936 will be held in June at Cologne.

Many new ideas are now being put forward, both as to the care and exhibition of captive animals, and also in regard to the educational possibilities of zoological gardens. "The new international body should prove fruitful in accelerating change and obviating the repetition of mistakes," says *The Times* in making the foregoing announcement.

Horse *versus* Motor Transport

Horses for Commercial Transport an Economic Necessity

Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S.

The whole question of horse *versus* mechanical employment resolves itself into a matter of expense and whatever is cheapest is surely the best. The present agitation threatens the very existence and livelihood of a large number of horse vehicle owners, small traders, horse keepers and carmen. It is a matter of life and death to thousands of poor men in Southwark, Lambeth, Bermondsey and other boroughs and constituencies in the Metropolitan Area. There is room for both horse and motor transport in the common activities of life, and in the carrying out of industrial undertakings.

The Council of the National Horse Association of Great Britain have protested most strongly against regulations affecting horse-drawn traffic, as they feel that the restrictions would specially hit the small trader with poor financial resources, and would establish a precedent very dangerous to horse interests. It is essential that the right of using the most economical form of transport should be available to all organisations in the interests of the trade and industry.

London's Traffic Problem

Traffic Congestion.—Considering that it is the great increase of motor traffic in both numbers and volume which has brought about the present state of traffic congestion, it is questionable whether the abolition of horsed transport would effect any material change. The real solution of the problem is far removed from the horse question.

Traffic blocks and hold-ups on our main passenger thoroughfares are directly due to the large and increasing volume of motor vehicular traffic, the large motor buses, private motor cars, taxis, motor vans, motor lorries and motor coaches.

No doubt the recent census of traffic on the main roads will indicate a very small percentage of horse-drawn vehicles, due obviously to the fact that horses do not use the main thoroughfares wherever they can be avoided, but to put any restriction on their use in, and the crossing of main routes would debar them from less frequented thoroughfares, and be to the detriment of economic transport by traders. Horses are used for comparatively short distance local trade. Horse transport studiously avoids the main thoroughfares, and makes the best possible use of less frequented streets to which it is more suited and along which it plies with greater comfort to the horses and economy to the commercial firms employing them. Horse transport at times must cross main passenger traffic routes, but it can do so at equal pace with other forms of transport and no delay or block is occasioned; indeed, the invariable rule is for the slower-moving horse transport to hug the near side kerb whenever entering or emerging from main thoroughfares, allowing faster-moving motor vehicles to pass.

Adaptability

There can be no question that in the common commerce of large cities and towns the horse and horse transport is most adaptable, handy, convenient and reliable.

It is now generally accepted that the most profitable utilisation of horses in commercial activity lies within a radius of four to six miles. Some carrying firms in London operate in an eight-mile radius, their horses covering as much as 20 miles per day, while local tradesmen, retail houses of business, and municipalities may confine the area for their horse transport to a three-mile or even as low as a two-mile radius. *In the narrow turnings and courtyards such as abound in London and other large cities, there is the tremendous advantage, often unrealised by the general public, that a horse-drawn van with its full lock can turn round much more quickly and with far less disturbance to its neighbours than a motor van with its far larger turning circle. The experience of commercial firms testifies to this, and that for narrow streets and confined yard spaces the horse and horse transport is supreme.*

A leading London transport firm on a basis of 20 miles per day gives costings as follows:—

	Light horsed vehicle (One horse)		Heavy horsed vehicle (Two horses)	
Cost per day of eight working hours	*s.* 17	*d.* 9	*s.* 25	*d.* 7
Cost per hour	2	2½	3	2½

	Motor Van (25 cwt.)		Heavy Lorry (4 tons)	
Cost per day of eight working hours	*s.* 24	*d.* 2	*s.* 36	*d.* 6
Cost per hour	3	0½	4	6½

A large London stores computes its daily costings for 313 working days per year, and eight hours per day at 18s. 10d. for single light horse van, £1 4s. 1½d. for a 25 cwt. motor van, £1 4s. 2d. for a pair horse van, and £1 7s. 8½d. for a three ton motor lorry.

The all-in costings of one of London's dairy companies with a large stud of cobs work out at 13 shillings and 9·38 pence per single horsed vehicle per day.

A co-operative business concern in the provinces with a stud of 400 horses and 80 motor cars for house to house delivery of commodities such as coal, milk and bread, gave their costings per week as follows: single horse vehicle, £5 15s. 7½d.; 25 cwt. motor vehicle £10 0s. 7·2d. (per week of 48 hours); pair horse vehicle £5 18s. 7½d. per horse; 4 ton lorry £15 8s. 7·4d. (per week of 48 hours.)

The costings attaching to a London municipality daily are estimated at 18s. 10d. for a single horsed vehicle, while those for a 4 ton lorry are estimated at £2 5s. 8d.

Kindred Interests

Any interference with the use of the horse for transport would disorganise the work, and throw into unemployment many thousands of drivers, horse foremen and stable hands. These men are semi-skilled workers, and if out of work, would obviously have the greatest difficulty in finding re-employment in these days. Then there are the many skilled workers who depend for their livelihood on supplying the needs of the owners and users of horse transport, such as shoeing smiths, blacksmiths, wheelwrights, horse dealers, saddlers and harness makers, veterinary surgeons, corn merchants, hay and straw dealers, together with the producers of the corn, hay and straw—and be it remembered that horses consume

British agricultural produce. With their employees, and the families supported by them, hundreds of thousands must depend on the continued use of the horse for their living. The farmers and agriculturists would obviously lose their very best markets for the disposal of their young horses, and for the agricultural produce with which to feed them.

Commerce in Relation to Agriculture

In these days of agricultural depression the ordinary farmer and small holder could never afford a tractor to till his land, harvest his crops, and perform the common duties of farm work. Horses are essential for the necessities of farming operations, and the raising of horses is a valuable asset to the farmer. In other words, the horse is a rent payer. Broken in at two-and-a-half years, he is used for the common work of the farm and earning his keep up to four years old when he is sold to a commercial firm at a good profit to the farmer.

Horse breeding, whether for commerce or pleasure, is an integral part of agriculture, and the failure of the country to make full and proper use of the horse in every sphere will be fraught with disastrous consequences. A conservative estimate of the number of industrial horses in Great Britain is 200,000, which, on an average of £40 per head, per annum, for feeding, provides a market for nine to ten million pounds worth of agricultural produce. Any marked reduction in the horse strength of the country will have an appreciable effect on the agricultural situation and would destroy the two valuable markets of the farmers for disposing of horses and farm produce.

Considering that practically everything connected with the horse—food, litter, harness, vehicle, etc.—can be produced within our country, there is little doubt that in the proper and full use of the animal's services a valuable contribution to the welfare of the nation is being made, and, in addition, is helping an industry that is always very hardly hit in times of depression.

The above figures sufficiently demonstrate that in commercial circles and in the common trade of the country, whether such relates to the smaller trader, the large carrying company, the retail business firm, the milk vendor, the City Corporation or the Municipality, the horse, properly used, is an indispensable factor, and that horse transport in its recognised sphere of utility, carries economic advantages over mechanised means of transport. Long distances by road, and heavy haulage are not the metier of the horse, and are best left to a mechanism which is calculated in multiples of horse power.

The Horse Efficiently Employed

The short haul in towns is peculiarly the province of the horse. In all large commercial towns the docks, warehouses and goods yards are in close proximity, consequently there is a preponderance of short hauls. Tests made on mixed loads showed that when motors were employed on this class of work only 27 per cent. of the total motor time was in actual movement. Seventy-three per cent. must therefore have been taken up in loading and unloading, waiting turns at warehouses, etc. *Thus the advantage claimed for the motor*, i.e., *speed, only applies for approximately one quarter of the working day.* This is insufficient to counter the difference in the comparative costs of a motor unit and a horse unit.

A leading Transport paper, "The World's Carrier and Carrying Trades Review," in its August number writes as follows:—

"It is practically impossible for a comparatively small haulier to change quickly from horse to mechanical traction, as to do so would require much more capital than is usually at his command. Those hauliers who still retain some horses regard them as essential to economic and efficient working. In restricted areas, where many calls have to be made, the horse cannot be beaten, as the frequent stopping and starting of motor vehicles is expensive. The Minister of Transport has said that he is obtaining the views of the largest users of horse transport in London and is enquiring, amongst other things, whether they might find it practicable to change from horses to motors in the course of the next three years. We trust that these large horse users will feel it incumbent upon them not only to give the Minister their own opinions but to put in a word on behalf of the smaller horse owners. There are something like 5,000 carters in Liverpool alone who would probably lose their employment if horses were barred in that city. Even if the Oxford Street experiment has been successful, dock areas, for instance, are not the West End."

Relative Cost

The real determining factor in whatever the form of transport employed is one of cost. Cost is an embracive term and variable. It starts with the initial purchase prices of horses and horse wagon on the one hand or a motor vehicle on the other. These may be taken at £50 to £75 for a heavy draught horse, £40 to £50 for a van horse, £70 to £100 for a heavy horse vehicle, £70 to £80 for a light horse vehicle; £160 to £400 for a 25-cwt. motor lorry, and £500 to £800 for a 4-ton lorry.

Even when a horse has finished with town work, quite a good price is fetched for the animal, which then spends many useful years as a farm horse.

Cost also includes, in the case of horse transport, drivers' and stablemen's wages and insurance, feeding and stabling charges, saddlery, grooming, veterinary attendance, shoeing, depreciation of horse (the average service being, say, eight years), depreciation of vehicle (the length of life being from ten to 20 years), insurance, repairs, and the interest on capital outlay of horse, vehicle and harness. In the case of motor transport, charges include wages and insurance of drivers and loaders, petrol (13 to 20 miles to the gallon for a light motor lorry, and six miles to the gallon for a heavy lorry), oils, repairs, garaging, cleaning, licence at £26 for a light lorry (25 cwt.) and £48 to £60 for a heavy lorry, insurance at 2 per cent. to 3½ per cent., depreciation at 15 per cent. (the average length of service being six-and-a-half years) and interest on capital outlay at 5 per cent. The overhead expenses of interest on capital, licences, insurance, and depreciation are heavy in the case of motor vehicles; there is no tax on a horse drawn vehicle when the name of the owner is displayed on it. In addition to the above the maintenance and storage of spare vehicles from an overhead charges point of view is greater in the case of motor transport than with horse transport, and moreover the latter can always work on the basis of a change of horses for individual vehicles; not so with mechanically propelled vehicles.

(*Concluded at foot of next column.*)

Clinical Communication

THE SPECIFIC VALUE OF CRUDE IRON COMPOUNDS IN THE TREATMENT OF "PINE" IN CATTLE AND SHEEP

JOHN BROWN, F.R.C.V.S.
INVERGORDON

For a number of years previous to 1932 we were repeatedly meeting with cases of "pine" characterised by emaciation and progressive debility. These cases occurred particularly in young cattle; on some farms, however, all the cattle and sheep were unthrifty and showed little, if any, response to extra feeding.

In one instance it was observed that, on one of the two farms belonging to the same owner, the young stock throve badly but, when they were removed to his other farm, two miles distant, they at once began to improve in condition. This continued for several years, but we were unable to explain at that time why the change should prove so beneficial. This "pining" farm eventually changed tenancy but, after two years, the tenant gave it up on account of his losses from "pine" among his cattle and sheep.

At this time there appeared an article by Dr. J. Russell Greig on that form of "pine" which he, with Dr. Dryerre, had investigated on the island of Tiree[1]. They found that the "pining" areas on the island could be sharply delimited from the "non-pining" areas. They discovered that the disease was due to a deficiency of available iron and that the administration of iron compounds was effective both as a means of prevention and cure. They also expressed the opinion that many areas deficient in available iron occurred throughout Scotland, but stated that the location and extent of these areas remained to be determined.

Because of the clinical similarity of the "pine" occurring in my district and that described by Greig and Dryerre, I got into communication with the Moredun Institute and Dr. Dryerre kindly made tests of the blood of affected animals, when it was found that, in the case of both sheep and cattle, the blood was deficient in hæmoglobin to the extent of 30 to 50 per cent. All the animals on the farm from which the samples were obtained were put on a ration of iron oxide. The response was almost immediate and the animals continued to thrive.

On another large arable farm there had been a history of "pine" for half a century. The calves bred on this farm were mostly black in colour and, when turned out in the spring, were in quite good condition. By the late summer and autumn their colour had changed to a dirty brown and all had become poor in condition. The cows and the other young stock became somewhat similarly affected. Blood samples from the cases on this farm likewise showed a hæmoglobin deficiency of from 35 to 50 per cent. For the last two years every animal on the farm has received a ration of iron oxide and, as a result of this treatment, the whole stock is to-day in excellent physical condition.

The most severely affected cases I have seen occurred in a neighbouring county, in a herd of pure Shorthorns. When I visited the farm, I was first shown 17 18-months-old heifers in a condition of such advanced emaciation that they resembled cases in the last stages of Johne's disease; in fact, the owner thought it was Johne's disease, as diarrhœa was one of the symptoms. It was found, from blood tests, that most of these heifers were deficient in hæmoglobin to the extent of 60 per cent. Here, too, all animals were put on a ration of iron oxide and, in a short time, every animal had markedly improved in condition. To-day the herd is equal to the best in the county.

In numerous instances, owners have complained that their cattle took too much feeding without commensurate improvement in their bodily condition. It was found that when iron was added to the rations of these animals, they at once commenced to improve.

In sheep, an iron deficiency with consequent failure to obtain perfect health is also prevalent. In one flock of Cheviot ewes that were in-lamb and doing badly, a blood test, made by Dr. Dryerre, showed that they were deficient both in hæmoglobin and calcium, the former 43 per cent. and the latter 27 per cent. deficiency.

I clearly recognise that worm infestation of young stock occurs in association with factors other than iron deficiency, but it is well known that any factor which lowers the animal's resistance to disease readily predisposes to

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COMPARATIVE COSTINGS OF HORSE *versus* MOTOR TRANSPORT

Some years ago very carefully compiled and detailed statements of comparative costings of horse *versus* motor transport were kindly supplied by 14 municipalities and 14 commercial firms in the metropolis and in the provinces under the headings of single horsed vehicles, pair horsed vehicles, 25 cwt. motor vehicles, and 4 ton motor lorries. The statements distinctly show that for the ordinary trade of cities and towns, *viz.*, in distributive trades, manufacturing trades, cartage of goods, and in the work of local authorities, the horse is much cheaper than the motor on a daily computation of work, and working within a radius of from four to six and sometimes eight miles.

helminth invasion. In this district, for a number of years, parasitic gastritis in lambs has been a menace. It may be kept in check by the repeated administration of anthelmintics, but this year I advised those farmers who had suffered in previous years to allow the ewes and lambs access to an iron mixture *ad lib.* It is remarkable how young lambs will take a mixture of iron and salt without any foodstuffs being mixed with it. The result has been most encouraging. On about a dozen farms where this treatment has been carried out, no anthelmintic treatment has been necessary and the lambs have all attained splendid condition.

Whether the iron has an inhibitory effect on the worm larvæ, or whether it increases the powers of resistance of the animal, I do not know; but it is possible that a combination of both factors may be concerned.

In pigs, the effect of iron is quickly noticed and, if in-pig sows received an allowance of iron, there would be fewer cases of anæmia in piglets.

For some time, in all outbreaks of contagious abortion, I have advised, besides other treatment, giving the cows a daily ration of iron. I have one client who is convinced that the feeding of iron oxide eliminated abortion from his herd without any other treatment; but the iron in this case may have been given more credit than it deserved. Nevertheless, even if the administration of iron in an infectious disease be empirical, it may not be without benefit.

The form of iron employed is crude iron oxide. One part of common salt is mixed with two parts of iron and the mixture is placed in boxes, to which the stock are allowed free access.

I am writing this article in the hope that it may prove of interest to other practitioners in whose practices there occur cases of progressive emaciation without obvious cause, as I am of opinion that iron deficiency must be of common occurrence in districts other than my own.

In conclusion, I would express my appreciation of the ready help afforded me in these observations by the Moredun Institute, Edinburgh.

[1]Greig, J. R. *Scott. J. Agric.* 1933. xvi.

It was reported at a meeting of the Devon Diseases of Animals Sub-Committee that the discovery of faulty packets of sheep-dipping powder had necessitated the withdrawal from various shops of 6,000 similar packets, and the redipping of sheep which had previously been treated with the powder. According to the analyst (Mr. W. G. E. Quick) the trouble was due to the fact that when a sheep bath was made up according to the directions indicated on the packet, it was only two-thirds of the required strength.

Abstracts

[**Evipan Narcosis in the Horse.** Velu, H., Weyland, H., and Ipousteguy, P. (1935.) *Bull. Acad. vét. France.* **8.** 1. 59-61.]

The authors have studied the effects of sodium evipan on about 20 horses. In the majority of cases, it was impossible to determine the exact time at which consciousness returned, but this seemed to vary in individual animals. In one case, 7·5 g. of sodium evipan produced narcosis for one-and-a-quarter hours, whereas in another case, 8·0 g. given in two doses, the second 30 minutes after the first, produced perfect anæsthesia for several hours. The authors conclude that small doses of sodium evipan may be of value for the suppression of reflex movements, but it is impossible to estimate the degree of anæsthesia a given amount of the drug will produce in the horse.

J. A. N.

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[**The Beneficial Action of Cocaine and its Derivatives upon the Evolution of several Affections of the Horse.** (Trans. title.) Marcenac and Carnus. (1935.) *Bull. Acad. vét. France.* **8.** 1. pp. 71-76.]

This report was introduced to the French Veterinary Academy by Professor Coquot, who described it as being based upon the findings of Pécus on the curative action of local anæsthetics when injected along nerve tracts, and as demonstrating results that well merit further research.

Working at the French Cavalry School at Saumur, the authors found that in about 12 per cent. of cases in which injections of local anæsthetics were made for diagnostic purposes, quick resolution of the lesions was obtained in cases which otherwise would have been deemed intractable.

They were successful with the following treatments:—

Periostitis cases involving the cannon bone: injection of 5 to 10 c.cs. of 1 to 2 per cent. solution of scurocaine into and around the lesion with repetition in four days' time if necessary. This led to a rapid "densification" and a comparatively quick return to work.

Acute tendinitis: they employed the same technique, but increased the dose to 20 to 30 c.cs. The course of resolution of lesions in the cannon region was followed by measurements at definite intervals. A warm, œdematous swelling occurs within 48 hours, gradually receding by the fourth or fifth day. Further dosage should not be given until the œdema has dispersed.

Painful wounds causing lameness or pain under harness: infiltration of the depths of the lesion with 1 to 2 per cent. solution of cocaine, novocaine or scurocaine gave good results.

The authors think the beneficial action is due to a modification of vaso-dilation following trauma of sympathetic terminations, and leading to hyperæmia of the affected parts.

C. V. W.

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[**Hypomagnesæmia in Equine Transit Tetany.** Green, H. H., Allcroft, W. M., and Montgomerie, R. F. (1935.) *J. Comp. Path. & Therap.* **48.** 1. 74-79.]

Four cases of equine transit tetany, which occurred in a batch of Welsh mountain ponies after a railway journey of 21 hours, are described. Clinically the disease resembles that of bovine "grass tetany" or "lactation tetany." Blood analyses showed that both magnesium and calcium values were low—Mg 1·16 mg. (normal about 2 mg.) and Ca 6·67 mg. (normal about 11 mg.) per 100 c.c. of blood. The serum calcium and magnesium values obtained in equine transit tetany, in bovine lactation tetany, in milk fever of cows and in a mixed metabolic disorder of cows are compared and discussed. The authors conclude that hypomagnesæmia is the characteristic feature of typical "lactation tetany" occurring independently of calving date, characterised by nervous hyperirritability and commonly terminating in a convulsive seizure. Hypocalcæmia, with a suggested trend towards hypomagnesæmia, is the characteristic feature of "milk fever" occurring shortly after calving and commonly terminating in coma. A mixed metabolic disorder, in which the symptom complex is often so ambiguous as to render clinical diagnosis very difficult, may occur at any time in the bovine. In this condition both hypomagnesæmia and hypocalcæmia are pronounced, but the symptoms of the former are usually more prominent.

The "transit tetany" of the Welsh mountain ponies tends to simulate "atypical lactation tetany."

W. R. W.

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[**I.—The Differential Diagnosis of the Two Diseases of the Horse, "Schlafkoller" and "Dummkoller."** Dehner, O. (1934.) *Tierärztl. Rdsch.* **40.** 37. 645.

II.—The relationship between "Bulbokapnine" Intoxication and "Dummkoller" of Horses. Kok, D. J., and Harreveld, A. van. (1934.) *Deuts. tierärztl. Wschr.* **42.** 51. 813.]

I.—The two closely related diseases of the horse, "Schlafkoller" (sleepy staggers) and "Dummkoller" are described and compared with a view to differentiating one from the other. Until the author discovered the frequent appearance of hairless patches on the anterior aspect of the fetlock joints of the fore-limbs, attributed to stumbling, in the case of the former disease, an accurate diagnosis was impossible. The etiology remains obscure.

II.—The nervous symptom complex produced by injecting dogs, cats and monkeys with varying doses of "bulbokapnine," an alkaloid isolated from *Corydalis cava*, is described in detail. The authors observed that there is a marked similarity between the "intoxication" produced in this way and the symptoms associated with "Dummkoller." *C. claviculata* (Climbing Corydalis), a long, slender, green plant, climbing by tendrils, and two other species occur in Britain but *C. cava* does not appear to do so.

N. S. B.

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[**Causation and Prevention of Canker of the Hoof in the Horse.** Henkels, P. (1935.) *Deuts. tierärztl. Wschr.* **43.** 12. pp. 180-186.]

Professor Henkels, of the Surgical Clinic of Hanover Veterinary College, gives the results of his original research into canker and shows how external factors are highly, if not exclusively important in its genesis.

A microscopical examination of the horn of the sole and frog shows that it is composed of columns possessing central canals, which run more or less directly from the matrix to the free surface of the horn. Whilst these canals are normally very small and not open, many clinically normal hooves have horn with these canals of appreciable bore and filled or not with broken-down horn cells.

By steeping thin sections of normal sole or frog horn in equine urine for a few hours, it was found that these canals became "eaten into" by the urine, so as to become much wider on microscopical examination, and that urine penetrated strongly into any minute cracks which were present. Henkel's theory of the exogenous origin of canker is based on this finding. He believes that canker is caused by the penetration of urine and stable filth into crevices in the under-surface of the hoof, notably into the 'ateral clefts of the frog, where the soft frog horn meets the harder sole horn, it being remembered that the hoof is elastic and that microscopical movement takes place.

The penetration of erosive liquid matter is assisted by excessive paring and it finally reaches the matrix and underruns the horn, causing at the same time an unhealthy stimulus to the matrix, which then produces the abnormal soft cauliflower horn characteristic of canker.

The conditions under which canker occurs support the above theory; they include the site at which canker starts (frog clefts), its commonest occurrence in heavy draught horses at heavy work and the consequential energetic movements in the hoof, and its occurrence in horses, which as a class, have the feet badly cared for.

The author considers that heredity and endogenous factors have very little to do with the etiology of canker.

Amongst an unstated number of cases seen the fore feet alone were involved in 12 per cent., the hind feet alone in 37 per cent., fore and hind feet equally in 52 per cent. and all four feet in 33 per cent.: also 66 per cent. of cases occurred in horses between six and nine years of age.

J. E.

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[**Diseases of Foals.** Miessner, H., and Köser, A. (1935.) *Deuts. tierärztl. Wschr.* **43.** 10. 145-150.]

During an investigation into the cause of death of 232 foals, *S. abortus equi* was incriminated in 1·3 per cent. of cases, *S. enteritidis* in 4 per cent., *Bact. equirulis* [*i.e., B. nephriditis equi* or *B. pyosepticum* or *B. viscosum equi*] in 25·4 per cent., *Strep. pyogenes* in 34 per cent. and *Corynebacterium pyogenes* in 3 per cent. of cases. When the age of foals was considered in relation to the cause of death it was found that *S. abortus equi* generally produced death within a few hours of birth. The majority of deaths from *Bact. equirulis* occurred within the first few days of life. The majority resulting from *Strep. pyogenes* occurred within the first fortnight of life, the peak being reached between the fifth and eighth days. *Corynebacterium pyogenes* infection generally occurred in foals when one to three months old. The majority of deaths from unknown causes occurred during the first four days.

Control of foal diseases is almost entirely a question of good hygiene. Mares should be kept scrupulously clean and should be removed from the vicinity of any possible source of infection. Parturition should be allowed to take place in a specially cleansed enclosure. Foals should be kept clean, navel wounds should receive attention and on no account should sickly animals be allowed contact with healthy ones.

E. J. P.

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[**Critical Observations on the Diagnosis of Broken Wind in the Horse.** Stahn, Dr. (1934.) *Berl. tierärztl. Wschr.* **50.** 43. 705-707.]

The symptoms of broken wind may be produced by a number of different diseases, and the prognosis cannot be given accurately, without the special diagnosis of the underlying cause.

The symptoms may be caused by the following: (1) chronic emphysema of the lungs; (2) chronic bronchial catarrh; (3) chronic pneumonia; (4) neoplasms of the lungs; (5) valvular disease of the heart, and (6) chronic cardiac enlargement.

Recovery may be made from an attack of primary chronic bronchitis and details are given of a case in which a ten-year-old horse developed chronic bronchitis which later caused the usual symptoms of broken wind. After a few months the horse recovered completely, and all symptoms disappeared.

E. W. A.

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[**Local Wattle Pasteurella Infection in Fowls.** (Trans. title.) Lesbouyries and Berthelon. (1935.) *Bull. Acad. vét. Fr.* **8.** pp. 53-58. 4 figs.]

This article discusses the atypical form of fowl cholera, in which the organism is found localised in the wattles, causing œdema and abscess formation, without any generalised symptoms of acute fowl cholera. Either one or both wattles may be affected with a hot, bluish-red, painful œdema. The fluid in the wattle later becomes sero-purulent and as the lesion ages it forms a hard, yellow, structureless mass. The wattle shrinks, dries up, and a black necrotic scar forms.

From the experiments quoted it appears that this atypical form of fowl cholera is not a generalised infection with an attenuated strain of *Pasteurella aviseptica*, but is a local infection following trauma, the wattle showing a localised resistance to the organism.

Unsuccessful attempts were made to utilise this resistance of the wattle as a means of immunising birds by wattle inoculation.

R. F. G.

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[**An Outbreak of Fowl Cholera in Scotland.** Wilson, J. E., and Wilson, D. R. (1935.) *Vet. J.* **91.** 2. 57-59.]

This appears to be the first recorded outbreak of fowl cholera in Scotland and probably originated from the 1933 epizoötic in Norfolk. The mortality was heavy, 350 birds dying out of a flock of 500. In the majority of cases no symptoms were observed, and in many instances the birds continued to lay up to the time of death. A few birds showed nasal catarrh, drowsiness, inappetence, great thirst and diarrhœa. The most noticeable *post-mortem* lesions were pin-point areas of necrosis of the liver, petechiæ on the heart and congestion of the lungs.

Pure cultures of the organism, *Pasteurella aviseptica*, were obtained from the liver and heart blood. The organism was shown to be pathogenic for fowls, pigeons, rabbits, guinea-pigs and mice, in high dilutions. Blood from natural cases was virulent for the same animals in a dilution of 1:100.

R. F. G.

Report

STATISTICAL AND GENERAL REPORT, ARMY VETERINARY SERVICES, 1934-35

GREAT BRITAIN AND NORTHERN IRELAND

The average strength of horses during the year was 12,807, of which 1,579, or 12 per cent., were remounts. The average number daily under treatment was 683·53, or 5·34 per cent., and the average length of time during which each case was under treatment was 21·39 days. Admissions for treatment were 91·08 per cent. of the average strength and the wastage for veterinary reasons was 5·77 per cent.

The average strength of mules during the year was 297. The average number daily under treatment was 6·44, or 2·17 per cent. of the average strength, and the average length of time during which each case was under treatment was 24·50 days. Admissions for treatment were 32·32 per cent. of the average strength, and the wastage for veterinary reasons was 2·69 per cent. of the average strength.

The general health and condition of the animals in the home commands has been good. Admissions in respect of horses for treatment of " General Diseases " numbered 598, of which 362 were fever simple, and 116 debility. Thirty-seven cases of grass sickness occurred in the Aldershot, Southern, Eastern, Northern and Scottish Commands, of which 27 died and three were destroyed. There were 886 admissions for diseases of the respiratory system, the chief causes being catarrh, laryngitis, roaring and broken wind. Admissions for diseases of the digestive system numbered 1,587, of which 989 horses were treated for worm infestation. Admissions for diseases of the skin and connective tissues numbered 862, the principal causes being acne, dermatitis and ringworm. No cases of sarcoptic or psoroptic mange were reported during the year. Admissions for surgical conditions numbered 1,420. Specific diseases numbered 456, of which the chief were strangles 286, and influenza 160. The admissions for injuries numbered 5,625, of which 4,552 were wounds, contusions and galls.

EGYPT

The average strength of horses during the year was 1,784. The average number daily under treatment was 126·23, or 7·08 per cent. of the average strength, and the average length of time during which each case was under treatment was 27·15 days. Admissions for treatment were 95·12 per cent. of the average strength. The wastage of horses for veterinary reasons was 6·11 per cent. of the average strength.

The average strength of mules during the year was 608. The average number daily under treatment was 22·07, or 3·63 per cent. of the average strength, and the average length of time which each case was under treatment was 22·14 days. Admissions for treatment were 59·86 per cent. of the average strength, and the wastage of mules for veterinary reasons was 5·26 per cent.

The condition and health of animals in the command is very good. A high standard of animal management is maintained in all units. There is nothing special to remark on in respect to diseases.

ANNUAL REPORT OF THE ROYAL ARMY VETERINARY SCHOOL, ALDERSHOT, 1934-35

During the year five courses of instruction were held, *viz.*, (*a*) one for regular officers R.A.V.C. (three months); (*b*) two in animal management for officers of the combatant branches of the service (four weeks each); (*c*) two in animal management for N.C.O.'s (six weeks each). In respect to sub-head (*b*) 39 were examined. Thirty-four passed (five with distinction), and under sub-head (*c*) 101 were examined and 95 passed (two with distinction). In laboratory work 1,099 examinations were carried out, of which 677 were fæces for the presence of helminth ova infestation, 150 for diagnosis of parasitic skin disease, 68 for pus and allied material, and 78 were *post-mortem* examinations of horses' feet after X-ray.

Vaccines were prepared and issued as follows: stock catarrh vaccine 2,996 doses; stock pustular dermatitis vaccine 2,112 doses; and spleen extract 1,050 c.cs.

Of biological products, 430 doses of anti-tetanus serum were issued.

Of mallein, subcutaneous, 2,000 doses were produced and 5,872 doses issued, and I.D.P. 5,000 doses were produced and 5,872 doses issued.

In radiology, the X-ray apparatus has operated successfully during the year, and the uses of radiography in diagnosis continue to increase.

ANNUAL REPORT OF THE SCHOOL OF FARRIERY, ALDERSHOT, 1934-35

Under (A) Instructional Work, the number who joined from April 1st, 1934, to March 31st, 1935, was 61, and the number who passed during the period was 66. The percentage of

(*Continued on column* 1, *page* 1238.)

N.V.M.A. Divisional Reports

WEST OF SCOTLAND V.M.A.*

MEETING AT GLASGOW

A meeting of the West of Scotland Division was held in the St. Enoch Station Hotel, Glasgow, on Wednesday, June 19th, 1935.

The President, W. Watt, Esq., M.R.C.V.S., occupied the chair and the following members were present: Messrs. Campbell, Brown, Meikle, McGregor, McIntyre, Andrews, Brodie, Jas. F. Taylor, John McFarlane, Professor William Robb, and the Hon. Secretary, Mr. A. Thomson, Messrs. M. H. Miller, John McLauchlan, J. M. Macaulay, R. G. Anderson, and William Nairn were present as visitors.

The minutes of the last meeting, not having been printed in *The Veterinary Record*, were left over.

Apologies for absence were received from Messrs. A. M. K. McLeod, Jas Waddell, John Weir, W. J. Young, Professor G. W. Weir and Mr. A. Gofton.

Nominations.—The following were nominated for membership: Messrs. M. H. W. Miller, A. M. K. McLeod and John Weir.

ADDRESS BY MR. NAIRN

The Chairman then called upon Mr. William Nairn, Blairgowrie, to open a discussion dealing with matters of veterinary interest and principally with the Report of the N.V.M.A. Special Committee on the Report by the Economic Advisory Council on Cattle Diseases.

Mr. NAIRN, in his remarks, said that the committee had given the Report a great deal of consideration and that their Report was in the nature of a compromise between the ideal and the possible. The Economic Advisory Committee's Report showed that they had a hankering after a State Veterinary Service, but there was a fear of the vested interests of Local Authorities. There was certainly a need to raise the standard in backward areas: Britain was backward in many ways in public health interests. Throughout the Report there was a bias in favour of the whole-time officer, forgetting the wider interests concerned. The general practitioner might be regarded with greater sympathy. The sinister part of the Report was the indication that not only would these officers be required to deal with matters of public health, but that their duties would in time embrace other diseases of cattle and diseases of fowls. In other words, there was to be a progressive invasion into the realm of the general practitioner. Alternative schemes which might meet the needs of the country and satisfy the profession as a whole, might be run under a system of State Insurance. At the present time it would be difficult to initiate the scheme as it stood, as the profession was not yet overcrowded.

Mr. Nairn went into the question of part-time services having been considered inefficient and said that he considered it was unfair to make that allegation. The trouble lay not in the inefficiency of the members in carrying out their duties, but in the lack of co-ordination, and the speaker expressed the opinion that if there was one whole-time officer in an area to co-ordinate efforts, much could be accomplished in the eradication of tuberculosis. The West of Scotland scheme which was adopted by the N.V.M.A. might well have been taken as a pattern by the Committee on Cattle Diseases. It was certainly difficult to swallow any compulsory scheme for the eradication of tuberculosis, but the control movement order in the U.S.A. had been most effective to this end. The profession should not wait for schemes to be foisted on them for which they would have little redress, but they should prepare the ground and set their own house in order, having no division within their ranks; they might then go to the Minister of Agriculture and make their representations and they would probably be listened to sympathetically. In Scotland at least, they should try to benefit from the difficulties which were arising in England and which might arise there, if they did not tackle those problems now.

He would suggest that the Executive of the Scottish Branch be asked to form a representative committee and go very thoroughly into all these questions.

They could not stand still; they must go forward or back; and they could, if they tackled these problems sensibly and tolerantly, go forward united and with added strength.

The PRESIDENT, having expressed the hope that a good discussion would follow, said that

* Received for publication September 24th, 1935.

pupils qualifying as Farriers, Class III was 96·25, and the average period for which each pupil was under instruction was 6·85 months. Under (C) Productive Work, the number of horses shod during the period was 2,504, the number of shoes put on was 7,278, and the number of shoes made during the period was 3,374. The average number of horses shod in the working day was 7·9, the average number of shoes "put on" was 27·9, and the average number of shoes made was 12·9.

J. M.

the first thing to consider in the formation of any plan was what action was to be taken. It must be an agreed action among all sections of the profession.

He would like to point out that from the agriculturist's point of view they, as a profession, had not stressed sufficiently the loss in animals due to the ravages of tuberculosis. If they could convince the farmers that they were losing money and that this loss could quite surely be remedied, he felt sure that a quicker advance would be made.

Mr. Donald Campbell felt that the Report of the N.V.M.A. dealt fairly with the problem. A panel of practitioners under a county veterinary officer could easily operate any Orders, which would allow of all sections participating in the advance of the profession.

Mr. D. Brown suggested a combined meeting of the Division with the Scottish Society of Veterinary Inspectors to discuss the problem fully as it applied to Scotland.

Mr. Meikle agreed with Mr. Campbell that all practitioners should be included in the scheme.

Mr. McGregor said that, as things were shaping, there would soon be a dearth of practitioners in Scotland; he could see no insurmountable difficulty in the formation of a panel of practitioners. He suggested that the Branch Committee be asked to consider the question as it affected Scotland and that the Scottish views be forwarded to the proper quarters. He could see the benefit that might ensue generally from a State Insurance Scheme.

Professor Robb observed that his position was really a neutral one: his cattle testing had all gone. On the question of the setting up of a panel of practitioners, he could only take a line through the Horse Breeding Act, where the present system certainly worked quite well. He would support any measures which would allow of the profession working as a united body.

Major R. Anderson said that the panel system operated under his supervision in Fife, and they had no difficulties.

Arising out of the discussion, it was agreed to ask the Scottish Branch to call a meeting of the Executive without delay to consider these problems as they affected or were likely to affect Scotland and to ask that additional members be co-opted to ensure a balance of opinion.

The meeting terminated with a warmly accorded vote of thanks to Mr. Nairn for so kindly coming at an inconvenient time for a country practitioner and for his excellent summary of the position, and to the President for his conduct in the chair.

Alex. Thomson, *Hon. Secretary.*

DUMFRIES AND GALLOWAY V.M.A.*

SUMMER MEETING AT CASTLE DOUGLAS

The local branch of the Association held their Annual Summer Meeting at Castle Douglas on Thursday, July 11th. The business meeting was held in the forenoon, when the following gentlemen were admitted to membership: Mr. A. Gibb, proposed by the President, seconded by Mr. A. Young; Mr. R. E. Murison, proposed by Mr. J. Bell, seconded by Mr. A. J. Milligan, and Mr. Tom W. Woodhead, proposed by Mr. J. Bell, seconded by Mr. A. J. Milligan.

The minutes of the previous meeting, as published in *The Veterinary Record*, were approved on the motion of Mr. Bell, seconded by Mr. A. J. Milligan. The following members attended: Messrs. J. Allan, J. Bell, G. D. W. Davidson (President), A. Edgar, A. Gibb, A. J. Kennedy, W. S. Mackenzie, A. J. Milligan, W. G. Robinson, A. Young and G. A. Sangster (Hon. Secretary).

Apologies for absence were received from Mr. F. A. Davidson, Dr. Dryerre, Dr. J. Russell Greig, Messrs. W. T. Hewetson, R. S. Kyle, P. McKinlay, R. Craig Robinson, W. Scott, R. Simpson, A. Steele, O. Stinson and W. Jackson Young.

After the adjournment of the meeting the members met for lunch and were joined by the visitors—Mesdames G. D. W. Davidson, A. Edgar, A. J. Kennedy, W. G. Robinson and Miss Robinson, Mr. and Mrs. Watt, Mrs. Young and Miss Robison.

Carrying out the programme arranged by the President, Mr. G. D. W. Davidson, the party spent an interesting and instructive afternoon. Travelling by bus—provided by the generosity of Mr. and Mrs. Davidson—they proceeded by way of Glen Lochar and Laurieston past the birth place of S. R. Crockett and through the country where so many scenes of his novels are laid, along the shore of Loch Ken, at the head of which sits Kenmure Castle, famous in history for its association with Mary Queen of Scots and the Jacobites of the Fifteenth Rebellion—through the Royal Burgh of New Galloway and on to Clattering Shaws to view the new dam which has been constructed to harness the waters of the Dee for the purposes of electricity. It is a wonderful construction and most interesting to all who visit it, but it was especially so to those who knew the district before, to see how the face of the countryside has been altered. Following the workings of the Electric Scheme past Glenlee the sightseers arrived at

* Received for publication September 19th, 1935.

Dairy, that lovely Galloway village so beautifully situated on the banks of the Ken. Here again the party were the guests of Mr. and Mrs. Davidson, when they partook of tea in the Lochinvar Hotel.

Here, in a few well-chosen words, Mr. Bell expressed the gratitude of all those present to Mr. and Mrs. Davidson for their great kindness. Lavish hospitality, congenial company, fine summer weather and beautiful surroundings all combined to make the day one to be remembered.

George A. Sangster, *Hon. Secretary.*

From *The Veterinarian*

October, 1835

Medical Men and Veterinary Surgeons

I feel myself pledged to resume the subject of the interference of the human surgeon with the rights of the veterinarian. That that interference does exist, and to a very considerable extent, is undeniable. How many members of the College of Physicians are there, who, when visiting a sick chamber, scruple not, *verbally* at least, to prescribe (forgive the expression) for the maladies of domestic animals, to the injury of the veterinary surgeon, and at the hazard of their own reputation too. It is a far more common thing than is generally imagined, and, to a certain degree, perhaps, excusable, from the wish to conciliate and to soothe the patient.

Two titled M.D.'s meeting in Bryanston Square, not many years ago, recommended spirit of turpentine for the tape-worm in a dog. It is true, they guarded themselves by directing only a small quantity of it to be given, and that in the form of pills, *cum mica panis*. The discharge of bloody urine which followed put a small sum into the pocket of those who should have been first consulted, or to whom the matter should have been referred. A surgeon, more venturesome, being consulted in a similar case, gave it in a liquid form, and the animal died as if struck with lightning.

A bitch, small, petted, irritable, suckled four puppies. She was doing well for a time, when all at once she staggered about the room; she fell, incapable of rising; and panted with a degree of violence which they alone who have seen such cases can imagine to be possible. A physician and a veterinary surgeon entered the house at almost the same moment, to see their respective patients. Before the former was permitted to inquire about the biped, he was requested to join the veterinarian, and give his advice respecting the quadruped. "Well, sir," said he, "this seems to be a bad case. What do you mean to do? You will bleed, of course!" He recognised not the fearful struggles of the irritability of exhaustion. "No, sir," replied the other, "I shall do no such thing; I do not mean to kill my patient outright:" and then, addressing himself to the servant, added, "bring me up some hot water and a foot bath, as soon as you can." "Well, sir, it is your patient and not mine, but I confess that is practice which I do not understand." "Perhaps not, sir." The bitch was put into a warm bath; a dose of physic was given; and two of her puppies were taken from her. She became apparently well, only for awhile somewhat exhausted. The veterinary surgeon presumes not to guess what was said in another apartment, but he was never again sent for to that house.

Another physician happened to see a similar case, and a very bad one, on which the veterinarian was attending. He was a kind and good man, and the writer of this leader owes him much obligation. He said little—certainly he objected to nothing; but when they were retiring, he said privately to the other, "Well, you have taught me a lesson to-day, by which, depend upon it, I shall profit."

The remedy of this evil is slow in action; it may be needful that the public mind should long be kept under its influence; but it is sure. The attainments, and the justly high bearing of the human surgeon, and the evident connection of his art with the welfare of society and the dearest charities of life, have at length won for him those golden opinions which he had a right to claim: and it is also in the power of every veterinary practitioner, who is skilful in his profession, and possesses some degree of general information, and has quitted the low associates and the low pursuits that used to be the millstone around the neck of so many—it is fully in his power to obtain the good-will and the friendship of the surgeon in his neighhourhood; and not only to prevent these interferences with his professional avocations, but to promote co-operation in the pursuit of medical science, and, in more ways than one, their mutual benefit. *But this must be a work of time.* Old prejudices are not at once discarded. A few, influenced by avarice, or a kind of professional sycophancy, but more from ignorance of our personal claims, or those of the art which we practise, may continue, directly or indirectly, to cross our path; but there is an increasing disposition, honourable to the human practitioner and advantageous to the veterinarian, to recognise the pursuits of each as only different branches of the healing art; and in their principles and their objects distinctly separate, and yet closely allied.

The time is not far distant when the veterinary surgeon, by his contributions to that neglected but all important subject, the knowledge of comparative pathology, that inexhaustible mine of medical improvement, will fully vindicate his claim to notice.

In the meantime, let him if need be, remonstrate mildly with those who invade his rights; let him, if compelled, appeal to their justice, honour, shame: but let him be more solicitous to establish his claim to their respect by professional skill, by sterling acquirements, and by honourable conduct.

At Barnstaple a producer was convicted of obtaining a payable order in respect of Cattle Subsidy by false pretences. Under the Cattle Industry (Emergency Provisions) Acts an animal which has calved is ineligible to qualify for subsidy if she has grown more than six permanent incisor teeth. The producer in question presented for certification a cow-heifer which apparently had grown only six permanent incisor teeth, and a certificate was issued. When the animal was slaughtered, it was discovered that her seventh and eighth incisor teeth had been broken off. The defendant pleaded guilty and was fined £5 and ordered to pay special costs.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Oct. 14th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Oct. 18th.—Meeting of the Mid-West Division, N.V.M.A., at Swindon, 2.15 p.m.

Oct. 24th.—Meeting of the Western Counties Division, N.V.M.A., at Taunton, 2 p.m.

Oct. 25th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds, 3 p.m.

Nov. 7th.—Annual Dinner - Dance of the Central Division, N.V.M.A., at the Mayfair Hotel, W.1, 6.30 p.m. for 7 p.m.

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PERSONAL

Promotion.—As published in *The Times* of the 5th instant, Mr. Norman Dobson, B.Sc., M.R.C.V.S., has been promoted Senior Research Officer, in charge of the Poultry Research and Diagnosis Department of the Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge.

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Presentation to Captain E. F. Angler.—The Doncaster Gazette states that a pleasing little ceremony took place recently at Doncaster, when a silver cigarette case was presented to Captain E. F. Angler, in recognition of his services as honorary veterinary surgeon to the Doncaster and District Kennel Association for a number of years. Mr. B. L. Carpendale presided and the gift, which had been subscribed for by the members, was handed over by Mr. F. C. Reynolds, the treasurer of the Association. Tributes were paid to Mr. Angler's efforts on behalf of the Association and the recipient suitably replied.

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R.C.V.S. OBITUARY

Addison, Charles Skirrow, Woodstock, Oxon. Graduated London, December 19th, 1908; died September 30th, 1935, aged 52 years.

Although he had only been practising at Woodstock since 1931, Mr. Addison had made a large circle of friends, and his keenness in his profession was widely known and appreciated in the district. He had previously practised in Ireland and Monmouthshire. He leaves a widow and four children.

Mr. Addison's practice is being carried on by his assistant, who has previously managed it in his absence.

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The death is announced of Professor Max Cremer, emeritus professor of physiology in the University of Berlin, and formerly head of the Physiological Institute of the Veterinary College, Berlin, aged 70 years.

LIVERPOOL DEGREE OF B.V.Sc.

Following is the University of Liverpool, School of Veterinary Science, Examination List for October, 1935, in connection with the University Degree of B.V.Sc.:—

First Examination. *Part II* (*Physics*).—John, H. M., Shaw, G. D. and Stewart, Brenda M. *Part III* (*Biology*).—Craig, N., Donnelly, J. F., Mullin, A. B. and Shaw, G. D.

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THE THREATENED HORSE BAN

At the recently-held Quarterly Meeting of Council, N.V.M.A.—a report of the proceedings of which will be published in an early issue—a sub-committee consisting of the President (Captain J. R. Barker), Mr. J. W. McIntosh, Major-General Sir John Moore and Captain H. W. Dawes, was appointed to co-operate with representatives of the National Horse Association in any further measures that body may decide to take to oppose the threatened banning of the horse from the streets of London and other large cities.

At a meeting of the Midland Counties Division, N.V.M.A., in Birmingham, a resolution was passed expressing concern at the statement of the Minister of Transport that he was considering the gradual elimination of horses from certain streets in London and other large centres.

The resolution recorded a protest against "any scheme which would not only affect the continued use of horses, but seriously prejudice financially many interests dependent, partially or entirely, on horses for their livelihood," and emphasised the necessity of keeping up supplies of reserve horses for Army purposes.

Congestion of the streets, it was suggested, could be relieved by prohibiting parking of motor-cars in long lines on either side of main streets.

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NATIONAL HORSE ASSOCIATION PUBLICATIONS

The article by Major-General Sir John Moore, entitled "Horses for Commercial Transport," appearing elsewhere in this issue, is being reproduced as a brochure by the National Horse Association of Great Britain, 12, Hanover Square, W.1, and constitutes issue No. 33 of their admirable series of publications devoted to the interests of the horse and of horse users. Issue No. 34, also to hand, deals with slippery roads as affecting horse transport, and comprises reprints of a series of articles and reports on this very pressing problem. Copies of any of the Association's issues can be obtained free on application to the Secretary at 12, Hanover Square.

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BRITISH MEDICAL JOURNAL'S COMMENT ON SPAHLINGER EXPERIMENTS IN N. IRELAND

In its editorial comment on the Spahlinger experiments, *The British Medical Journal* of October 5th says:—

"To obtain a clearer picture of the results the deaths in control Group VI may be compared with those in Groups I and III, which received respectively the "old" and the "new" vaccines. Or, in accordance with Mr. Spahlinger's remarks on handing over the vaccines, Groups IV, V and VI may be taken as containing control animals, and compared with the vaccinated Groups I, II and III. By the first comparison five out of seven of the control and four out

of 17 of the vaccinated animals died, and by the second comparison six out of eleven of the control and five out of 19 of the vaccinated animals died. Either method shows that the vaccinated animals possessed an advantage over the controls, but the numbers are quite insufficient to satisfy any statistical test of significance. That a limited degree of success should have been obtained is hardly to be wondered at, since the vaccine used for Groups I and III differed in no essential way from an ordinary killed vaccine, and there is ample evidence to suggest that dead tubercle bacilli are able to produce a limited degree of immunity to experimental infection.

"When it is realised how few animals were available for observation, it is surprising that, instead of dividing them into two equal groups, vaccinating one and treating the other as a control, they should have been divided into no fewer than six groups and treated with five different preparations, two of which were apparently not expected to have any immunising value at all. For this arrangement Mr. Spahlinger himself was apparently responsible. No two vaccinated animals were treated alike; they all varied, either in the dosage or route of injection—subcutaneous, intramuscular, intravenous—or both. Many of the animals were infested with hoose worms, liver fluke, and intestinal worms. It is clear, therefore, that this experiment did not conform to the ideal conditions in which a straightforward comparison is made between two groups of healthy animals, one of which is treated and the other left untreated. The results, however, are considered by the Ministry of Agriculture of Northern Ireland to be so satisfactory as to raise the question of compulsory vaccination. Such a conclusion is surely premature. Workers who have had long experience of virulence and protective tests are aware of the relatively enormous variation in the resistance of animals of the same species, and even breed, and they realise the necessity of carrying out experiments on an adequate number of animals in each group. The Ministry is particularly impressed with the resistance of the vaccinated animals to actual intravenous inoculation of virulent bacilli. It must be pointed out, however, that two out of seven of the control animals survived this test. Moreover, it may be asked, is the single parenteral inoculation of virulent bacilli as severe a test as continual exposure to infection under natural conditions? This question may be answered very positively by those who are accustomed to argue on *a priori* grounds, but it is well to remember the striking results obtained by Professor Topley and his colleagues* in their studies on the immunisation of mice against mouse typhoid. Professor Topley found that, though a considerable degree of protection could be conferred by vaccination against a single intraperitoneal inoculation of living bacilli capable of killing 98 to 100 per cent. of the control animals, attempts to confer any lasting protection on the animals when exposed to natural infection under cage epidemic conditions were very much less successful. The results described on cattle establish a *prima facie* case for further investigation of Mr. Spahlinger's vaccine.

"It is to be hoped that a carefully planned experiment on an adequate number of animals will be undertaken, preferably under the control of a body such as the Agricultural Research Council, in order to obtain more reliable information than is available at present. Besides the control of vaccinated groups, it might be desirable to include a third group of animals inoculated with a dead vaccine prepared from freshly isolated bovine strains killed with the minimum of injury to their antigenic constituents. Until the results of such an experiment are available both the medical and the lay public will be well advised to retain an open mind on the value of the Spahlinger vaccine in the immunisation of cattle against tuberculosis."

* Greenwood, M., Topley, W. W. C., and Wilson, J.: *Journ. of Hyg.*, 1931, xxxi, 257.

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CONVICTION AFTER FOLLOWING PROFESSIONAL INSTRUCTIONS

Important Legal Point in Cruelty Charge

The interesting point was raised by the defending solicitor at a case recently heard in Bridgwater Police Court, as to whether a person could be convicted for cruelty to an animal if he had followed the instructions of his veterinary surgeon as to its treatment.

The case was one in which Herbert William Cook, farmer, of Westonzoyland, was summoned for cruelty to a horse by working it in an unfit state.

Evidence was given by a number of witnesses, including an inspector of the R.S.P.C.A., that the horse was seen attached to a mowing machine working in a field, and was in a very lame condition. Mr. Thos. James Patterson, veterinary surgeon, of Shepton Mallet, examined the animal and said the lameness was due to an old-standing strain at the fetlock joint, and in his opinion it was absolutely unfit for any kind of work.

Cook told the magistrates that the animal went lame and he called in Mr. Leonard Bovett, veterinary surgeon, of Bridgwater, who gave him oils to rub in and told him to first exercise the horse by walking it in a field every day for an hour morning and evening and then to put it at light work. He (Cook) followed these instructions, and the horse, although going somewhat stiff at first, improved as it went on working. After the inspector had stopped him from working the animal it went back again and eventually had to be destroyed. Mr. Bovett said no pain was caused by working the animal, which was the proper treatment for it.

The magistrates fined Cook £2, with advocate's and veterinary surgeon's fees, a total of £4 14s. 6d. Mr. F. W. Willmott, the defending solicitor, intimated that the question of an appeal would be considered.

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GRADE "A" HERD EXAMINATIONS IN EAST SUFFOLK

Following upon negotiations which have taken place between the local authority and representatives of the veterinary officers concerned, it is announced that at a recent meeting of the East Suffolk County Council it was decided to amend the scale of fees originally suggested for payment by the County Council to the part-time veterinary surgeons for carrying out the routine quarterly examinations of Grade "A" herds. The scale which has now been approved by the Council is as follows:—

1. A minimum fee of 10s. 6d. to include the examination of any number of animals not exceeding 12, with an addition of 6d. per animal up to a maximum fee of £2 2s.
2. A travelling allowance at the rate of 4½d. per mile travelled for the purpose of the routine examinations.

3. A fee of 10s. 6d. for each certificate issued as a result of the examination of a herd.

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VETERINARY INSPECTION IN FLINTSHIRE

At a meeting of the Diseases of Animals Sub-Committee of Flintshire County Council consideration was given to an application of a veterinary surgeon for an appointment as a veterinary inspector in connection with the Milk and Dairies (Special Designations) Order, 1923.

The sub-committee also considered the question of the appointment of a full-time veterinary inspector.

It was resolved: (1) That consideration of the application be deferred; (2) that the question of the appointment of a full-time veterinary service be deferred; (3) that the Clerk and Chief Constable interview the present part-time veterinary inspectors with a view to a revision of the existing scale of fees (including travelling allowances) payable to them under the Diseases of Animals Acts and the Tuberculosis Order, 1925.

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BOVINE TUBERCULOSIS IN BANFFSHIRE

In a report to the Banffshire Public Health Committee, Mr. W. McKay, County Veterinary Officer, said that a campaign was started a year ago, by lectures, etc., to freshen the interest among stockowners in the dangers of and loss caused by tuberculosis in their herds, and the response had been very encouraging. On June 30th, 1933, 22 animals had been dealt with under the Tuberculosis Order. On June 30th, 1934, 20 had been dealt with. For the first six months of this year 41 animals were dealt with, an increase of approximately 100 per cent. Not only that, but the interest taken by the farmer in reporting, disinfection of premises, etc., had been greater. During the past year records of tuberculosis in the county had been kept and from them he estimated that the direct and indirect (*i.e.*, calves, milk, etc.) loss to animal industry in the county was in the neighbourhood of £10,000 per annum. That that was to a large extent not recognised by the stockowner was unhappily the case, nor were serious efforts made to prevent what was, after all, a preventable disease. It appeared now that that apathy had been somewhat overcome and the farmer was realising that he could do something to cut down his losses from this scourge. As a further illustration, the total animals dealt with for the whole of 1934 numbered 47. This year to date practically 70 animals had been reported and most of them were not, as formerly, reported when practically at "death's door."

As far as the public health position was concerned, the significance of bovine tuberculosis in relation to human tuberculosis was well known from the medical officer's reports. In order to combat that, it was obvious at the beginning that an increase in the inspection of dairy cattle was essential. Those were formerly in the neighbourhood of two per annum. That figure had been doubled. The fact that quarterly inspections, with average good fortune, would not allow a tuberculous cow to be a source of danger for longer than three months, instead of six as heretofore, would be appreciated, and its effect in cutting down the expenses of institutional treatment to the potential infected human sufferers was also easily appreciated. For the first six months of 1934, four tuberculous cows were removed from dairies in the county. This year, no fewer than 13 cows were detected and removed from herds, an increase in six months of over 300 per cent. Some of these were reported by the dairymen and others were only detected by routine sampling of milk. During 1934 three milk samples were reported positive for tuberculosis. To date twelve had been so reported.

From these figures it was seen that approximately 10 per cent. of the dairies had shown tuberculous infection during the year. That apparent increase was not in fact a cause for alarm, as it was not in any sense an increase of infection, in his opinion, but merely the result of increased inspection, whereby the affected animals had been detected, which was more gratifying than alarming. A new system of milk sampling had been started, and by means of it it was hoped to carry out not only quarterly inspection but quarterly sampling of every dairy herd in the county, which should lead to very early detection and disposal of infected cows, and it was hoped, a considerable reduction, in due course, of human cases of the disease. As a further indication of the interest of dairymen, quite a few were buying in tuberculin-tested cows. Two dairies (excluding Ladysbridge) had tubercle-free herds, and some had about half their herds tuberculin-tested. One dairy had divided its herd in two—a completely tested byre and a byre of reactors.

The Chairman said Mr. M'Kay had given them a very comprehensive report, and it was up to farmers and dairymen to help themselves. There was no doubt that in a short time they would be compelled to have their herds tuberculin-tested, and it would be far better to start now and meet the position half way when compulsion came.

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PASTEURISED CERTIFIED MILK

Strong exception has been taken by producers to the proposal made by the Ministry of Health that in amending the regulations governing the sale of graded milk provision should be made for the pasteurisation of certified milk. It is felt that pasteurisation is unnecessary and would detract from the reputation of the highest grade of raw milk, which is produced and handled under the best conditions.

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MANDELIC ACID: A URINARY ANTISEPTIC

A ketogenic diet has been found to be curative in infections of the urinary tract and *Nature* quotes A. T. Fuller (*Lancet 1*, 1935, 855) as showing that under it *B*-hydroxybutyric acid is formed, appears in the urine and is the actual bactericidal agent. This acid, cannot, however, be given orally, as it becomes oxidised in the body before excretion. A ketogenic diet, moreover, requires careful and institutional supervision, and is also not tolerated by all patients. Seeking for a substitute, M. L. Rosenheim (*Lancet 1*, 1935, 1032) tested numerous keto- and hydroxy-acids allied to *B*-hydroxybutyric acid, and found that mandelic acid best realises the conditions necessary, for it is excreted unchanged, is non-toxic in therapeutic doses, and is bactericidal in an acid urine to *Bacillus coli* and other organisms that may infect the urinary tract. In order to ensure an acid condition of the urine, ammonium chloride is given with it. Mandelic acid is a white crystalline powder, readily soluble in water, and is now being manufactured by Messrs. Boots Pure Drug Co., Station

Road, Nottingham, from whom particulars may be obtained.

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ARMY VETERINARY SERVICE

Appointment in India

The Commander-in-Chief has appointed Major G. Williamson, R.A.V.C., to be Deputy Assistant Director of Veterinary Services, Baluchistan District.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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RESEARCH INTO EQUINE PNEUMONIA

To the Editor of The Veterinary Record

Sir,—I should like to endorse your editorial observation that Dr. Edwards' review of influenza and pneumonia in animals is noteworthy. As one who bears a measure of responsibility for what was done in the matter of research into equine pneumonia during the Great War, I admit the justice of his censure on the Army Veterinary Services for their inadequacy in this respect in the light of what we know to-day.

But it is easier to be wise after the event, as Dr. Edwards has found in having to wait until now before giving us his masterly review of what has happened in the past. War is not a good environment for calm philosophical reflection: it is a time for feverish energy and action and when we succeeded, as the records show we soon did succeed, by means of our admittedly inadequate researches, in reducing the incidence and severity of pneumonia on land and sea to a point where it was no longer a menace to military efficiency, we turned our attention to other matters which were a menace: such matters as mange, glanders, ulcerative cellulitis, and, above all, horsemastership, deficiency in which is the greatest single indirect cause of equine mortality in war.

As regards these matters, at least, I do not think that any subsequent researches have improved upon our work, and I am not yet satisfied that the researches related by Dr. Edwards constitute a solid basis for any immediate practical improvement on the work we did to control equine pneumonia, for reasons I will mention later. If the practical measures we took as the result of Watkins-Pitchford's researches had failed we should have persisted in research and should perhaps have gone farther, but they sufficed and we diverted our energies and his to other more pressing tasks.

It may be questioned, however, if Dr. Edwards has not gone too far in his assumptions. How and where, for example, did the German workers find the "natural infection" which we are told "the inoculated animals subsequently resisted after they had been exposed to risks in every possible way"?

What exactly were these risks? Were they greater risks than those I now quote from Watkins-Pitchford's report on his work at Swaythling? "To render such contact as close as possible (the contact of healthy experimental horses with infected ones) nosebags were kept upon horses with profuse nasal discharge and high temperature and those nosebags were then used to contain the feeds given to the test horses. The procedure was adopted for several days in each case (50 cases) but with the exception of one dubious case of nasal discharge the horses remained free from catarrhal or temperature disturbance."

Let it be granted by all means, out of courtesy to our German colleagues, that their inoculated animals proved immune to natural infection, but how much more immune were they than these uninoculated horses of our experiment, and, if so, how did they show it?

What steps did the experimenters take to make quite sure that the subjects of their experiments were not naturally immune or had not already acquired an immunity as was found to be the case with vast numbers of remounts during the War?

I submit that the only certain way to test the efficacy of any inoculation against "shipping fever" (as I prefer to call it until I am more sure of its classification than Dr. Edwards is) would be to inoculate about 100 young Shire horses on different farms in the winter and send them long journeys by railway in cattle trucks with little food and less water. After about one week the animals should be re-shipped to a collecting centre and put into training. If not more than 3 per cent. developed fever or pneumonia, and none gangrenous pneumonia, within three months from the day of inoculation, it would be proof of the practical efficacy of the vaccine.

Unless we thus reproduce with fair exactitude the actual conditions under which shipping fever is apt to occur in war time we are not making a practical test of an extremely advanced claim on the part of Löffler and his colleagues. It is difficult indeed to understand why so certain a claim and so definite a procedure were not at once followed up and made public in all countries—but perhaps they will be now that Dr. Edwards has brought the matter to light.

But pending such an experiment as above described or something substantial of the sort, preferably in this country or America, I would ask that direct criticism of the Army Veterinary Service in regard to its war-time researches into equine pneumonia be suspended.

For all practical purposes the measures we took as the result of the extremely valuable work of Watkins-Pitchford have not yet been improved upon and it is not the Army Veterinary Services alone that are to blame for inaction in this respect during the last 17 years.

References: (1) "Official History of the War," Veterinary Services.

(2) *Vet. J.*, xxiv of 1917.

Yours faithfully,

Wakefield Rainey,
69, Brook Street,
London, W.1.

October 5th, 1935.

The Editor acknowledges, with thanks, the receipt of the following:—

Reports of meetings of the North of Scotland Division, N.V.M.A., from Mr. Geo. Howie (Hon. Secretary), and the Western Counties Division, N.V.M.A., from Captain S. J. Motton (Hon. Secretary).

Communications from Professor W. Kearney (Dublin), Mr. T. F. Prime (Upper Norwood) and Mr. E. L. Taylor (Weybridge).

Report of the Fifteenth Annual Re-union Dinner and Annual General Meeting of the R.A.V.C. Old Comrades' Association, from Captain A. J. Warburton (Hon. Secretary).